# REMARKS

In view of the following remarks, the Examiner is respectfully requested to withdraw the rejections and allow Claims 1-17 and 19 as well as newly presented Claim 48, the only claims pending and under examination in this application.

### *Formal Matters*

Claim 18 remains cancelled without prejudice.

Claim 48 is newly added. Support for new Claim 48 can be found in the specification, e.g., at page 14, [0054] and in Figure 2B.

As no new matter has been added, entry of the above amendments is respectfully requested.

### *Rejections under 35 U.S.C. §103(a)*

Claims 1-8, 10, 11, 17 and 19 are rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Fox et al (WO 01/14591 published March 1, 2001) in view of Dames et al (United States Patent No. 6,323,770).

In order to meet its burden in establishing a rejection under 35 U.S.C. § 103 the Office must first demonstrate that the combined prior art references teach or suggest all the claimed limitations. *See Pharmastem Therapeutics, Inc. v. Viacell, Inc.*, 491 F.3d 1342 (Fed. Cir. 2007) ("the burden falls on the patent challenger to show by clear and convincing evidence that a person of ordinary skill in the art would have had reason to attempt to make [every element of] the composition or device, or carry out the [entire] claimed process, and would have had a reasonable expectation of success in doing so," (*citing KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1740 (2007))); *and see Omegaflex, Inc. v. Parker-Hannifin Corp.*, 243 Fed. Appx. 592, 595 (Fed. Cir. 2007) ("[t]he Supreme Court recently explained that 'a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art,'" (*citing KSR Int'l Co.* at 1741)); *and see Dystar Textilfarben GmbH v. C.H. Patrick Co.*,

464 F.3d 1356, 1360 (Fed. Cir. 2006) ("[once] all claim limitations are found in a number of prior art references, the factfinder must determine '[w]hat the prior art teaches, whether it teaches away from the claimed invention, and whether it motivates a combination of teachings from different references,'" (*citing In re Fulton*, 391 F.3d 1195, 1199-1200 (Fed. Cir. 2004))).

In making this rejection, the Examiner asserts that Fox teaches all of the elements of the claimed invention as recited in Claims 1-8, 10, 11, 17 and 19, but for the element of "applying a DC bias field and an AC tickling field". (Office Action mailed July 20, 2009 at pages 3-4) To remedy this deficiency, the Examiner cites Dames for its alleged teaching of "using a DC current and AC current to detect a magnetic tag" asserting that "it would have been obvious to one of ordinary skill in the art to apply the concept of using DC current and AC current (low frequency AC tickling field) to detect magnetic response of a magnetic tag as taught by Dames to the method of Fox to detect predetermined region of a magnetic marker or particles in assay" (Office Action mailed July 20, 2009 at page 4)

Applicants respectfully disagree and submit that in considering the references cited by the Examiner, one of ordinary skill in the art absent the teaching of the present specification, would **have no objective reason to combine** the cited references in the manner claimed in the subject application.

The MPEP § 2143.01 states that:

> A statement that modifications of the prior art to meet the claimed invention would have been " 'well within the ordinary skill of the art at the time the claimed invention was made' " because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). See also *In re Kotzab,* 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1318 (Fed. Cir. 2000) **"'>[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.'" *KSR*,

550 U.S. at ___, 82 USPQ2d at 1396 quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006).<

Dames is drawn to a method of interrogating a **macroscale** magnetically coded tag by applying a magnetic field to the tag and measuring the difference between the response of the tag in a zero field (i.e. magnetic null) and in a high saturating magnetic field. Interrogation of the tag can be achieved by either moving the tag with respect to the magnetic field or by holding the magnetic tag in a fixed position while scanning the magnetic field over it.

In making this rejection, the Examiner attempts to equate the magnetic "tag" disclosed by Dames with a magnetic nanoparticle, as claimed.

However, contrary to the assertions of the Examiner, one of ordinary skill in the art would not look to Dames for guidance to modify the teachings of Fox because, in contrast to the claimed invention, Dames teaches "using a DC current and AC current" for interrogating **macroscale** magnetic "tags", **not** magnetic **nanoparticles** as claimed. Indeed, in describing the dimensions of magnetic "tags", Dames discloses that "the minimum length of individual elements which can be used is probably on the order of a few millimeters" and that "the magnetic material is preferably in the form of a long thin strip". (see Dames at col. 3, lines 55-57 and col. 8, lines 22-27).

It has been well established that magnetic nanoparticles possess unique magnetic properties which make them distinct from macroscale magnetic materials. The scientific literature is replete with examples demonstrating this distinction. For example, Lu, et al. (*Angew. Chem. Int. Ed.* 2007; 46: 1222-1244) (Exhibit 1) and Lin, et al. (*J. Magnet. Magnet. Mat.* 2006; 305: 100-109) (Exhibit 2) disclose that magnetic nanoparticles are distinct from macroscale magnetic materials because magnetic nanoparticles possess novel properties not found in macroscale magnetic materials. For example, magnetic nanoparticles exhibit enhanced remanence, quantization of spin waves, giant coercivity, exponentially slow relaxation at low temperature due to anisotropy barriers, as well as exhibit superparamagnetism.

In contrast, macroscale magnets consist of a large number of magnetic domains that form so as to minimize magnetostatic energy of the material. For this reason, magnetic domains of macroscale magnetic materials play a significant role in determining its magnetic properties. However, as particle size approaches the nanoscale, the particle size and the exchange length converge allowing for single domain states. The magnetism and hence the magnetic properties of nanoparticles can therefore be dictated by properties such as anisotropy and external thermal energy (i.e., temperature). As such, magnetic nanoparticles are well known in the art to be distinct from macroscale magnets.

Therefore, Applicants submit that there would be no objective reason to combine the teachings of Dames, which employs **macroscale** magnetic materials to defeat the patentability of the instant claims which are specifically drawn to magnetic **nanoparticles**.

Furthermore, one of skill in the art would not look to the teachings of Dames because Dames precludes employing a magnetic nanoparticle as a "tag" and requires that a "tag" be a macroscale magnetic material. Indeed, Dames teaches that a "tag" is "characterized by carrying a plurality of discrete magnetically active regions in a linear array" and is "formed from a continuous strip of high permeability material, discrete regions of which have their magnetic properties permanently or temporarily modified." (see Dames at col. 2, line 66 – col. 3, line 1 and col. 3, lines 9-12). A magnetic nanoparticle, on the other hand, does not posses "a plurality of discrete magnetically active regions".

Therefore, in view of the extensive evidence in the scientific literature to demonstrate that magnetic nanoparticles are distinct from macroscale magnetic materials and because Dames requires a **macroscale** magnetic "tag", Applicants submit that one of skill in the art, would **have no objective reason to combine** the cited references in the manner suggested by the Examiner.

Further supporting the above conclusion that there is no motivation to combine the references is that the cited references relate to completely different fields of endeavor, and

therefore are not properly combinable. With regard to the appropriateness of combining references, MPEP § 2141.01 (a) states:

> "In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992).

The Applicants submit that Fox as been improperly combined with Dames because Dames is not in the field of the Applicants' endeavor and is not reasonably pertinent to the particular problem that is the concern of the invention. The rejected claims are drawn to a high sensitivity method of detecting biological molecules bonded to magnetic nanoparticles. (see specification at page 2, [0003]-[0004]) On the other hand, Dames is drawn to interrogating macroscale magnetic "tags" for "inventory control, ticketing, automated shopping systems, monitoring work-in-progress, security tagging, access control, anti-counterfeiting". (see Dames at Column 1, lines 45-49) and as such is completely unrelated to the field of Applicants' endeavor.

Therefore, in making the rejection of the claims over Fox in view of Dames, the Examiner has improperly combined the Dames reference, there being no motivation or suggestion to do so and the Dames reference being from an unrelated field. For this reason alone, the Examiner has failed to present a proper *prima facie* case of obviousness.

Furthermore, even if the references are combined in an attempt to read onto the rejected claims as suggested by the Examiner, Applicants submit that there is no objective reason to believe, absent the instant disclosure, that such a combination would be a predicted success.

With respect to obviousness, there must be a reasonable expectation of success in the claimed invention. In re Merck & Co., Inc., 231 USPQ 375 (Fed. Cir. 1986). This requirement was recently affirmed by the Supreme Court. The "predicted success" of a

combination of elements is an important factor in determining obviousness. This principle is illustrated in *three* Supreme Court cases (*see United States* v. *Adams*, 383 U.S. 39, 40 (1966); *Anderson's-Black Rock, Inc.* v. *Pavement Salvage Co.*, 396 U.C. 57, 60-62 (1969) and *Sakraida* v. *AG Pro, Inc.*, 425 U.C. 273, 282 (1976)) decided prior to *KSR*, and is a recurring theme of *KSR*. For example, in *KSR* the Supreme Court stated that in order for a combination of elements to be patentable "the combination must do more than yield a predictable result" (*KSR International v. Teleflex Inc.,* 127 S. Ct. 1727, 1740 (2007)) Likewise, the corollary principle, namely that "The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results" (*KSR International v. Teleflex Inc.,* 127 S. Ct. 1727, 1739 (2007) is also discussed. The Supreme Court in *KSR* also stated that that "a court *must* ask whether the improvement is more than the predictable use of prior art elements according to their established functions" (*KSR International v. Teleflex Inc.,* 127 S. Ct. 1727, 1740 (2007); emphasis added).

Thus, according to the Supreme Court, an analysis of the "predictable success" of a combination of known elements may be used to separate patentable combinations (e.g., a battery that contains water, in the case of *United States* v. *Adams*, *supra*) from those that are unpatentable (e.g., an adjustable pedal having a fixed pivot point and a sensor, in the case of *KSR, supra*).

As such, for a claimed invention to be obvious under the law, the provided art must provide a reasonable expectation of success for the claimed invention. If the provided art does not provide one of ordinary skill in the art with predicted success, the claimed invention is not obvious.

Although the Examiner asserts that "it would have been obvious to one of ordinary skills in the art to apply the concept of using DC current and AC current (low frequency AC tickling field) to detect magnetic response of a magnetic tag as taught by Dames to the method of Fox", none of the cited references teach or suggest that such a modification would be a predicted success. To the contrary, Fox is completely silent to applying a DC

bias field and AC tickling field. As such, there is no evidence absent the instant specification that applying a DC bias field and AC tickling field to the teachings of Fox would result in a successful detection method. Likewise, one could not reasonably predict the effectiveness of applying a "DC current and AC current" as disclosed by Dames on a system employing magnetic nanoparticles since Dames specifically teaches macroscale magnetic materials and is completely silent to magnetic nanoparticles. There is no objective evidence absent the instant specification, to suggest that application of a "DC current and AC current" would be a predicted success when applied to magnetic nanoparticles since it is well established that magnetic nanoparticles possess unique magnetic properties which make them distinct from macroscale magnetic materials. Indeed, a magnetic nanoparticle would be unsuitable in the teachings of Dames since Dames discloses that "tags" are "characterized by carrying a plurality of discrete magnetically active regions in a linear array" and that the "minimum length of individual elements which can be used is probably on the order of a few millimeters".

Accordingly, in view of the arguments above, Applicants contend that the Examiner has not established that the claimed invention as a whole would have been obvious to a person of ordinary skill in the art at the time of the invention. As such, the Applicants submit that a *prima facie* case of obviousness has not been established, and thus respectfully request withdrawal of this rejection.

Claims 1-8, 10, 11, 14 -17 and 19 are rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Coehoorn et al (WO 03/054523 published July 3, 2003) in view of Dames et al (United States Patent No. 6,323,770).

In making this rejection, the Examiner asserts that Coehoorn teaches "a method of magnetic detection comprising providing biological molecules on a substrate of a magnetoresistive device; adding magnetic nanoparticles conjugated with binding molecules specific for biological molecules on the substrate of the magnetoresistive device so that the biological molecules on the substrate and the nanoparticles form a complex; detecting

such complex". The Examiner acknowledges that Coehoorn fails to teach the element of "applying a DC bias field and an AC tickling field". (Office Action mailed July 20, 2009 at pages 5) To remedy this deficiency, the Examiner cites Dames for its alleged teaching of "using a DC current and AC current to detect a magnetic tag" asserting that "it would have been obvious to one of ordinary skill in the art to apply the concept of using DC current and AC current (low frequency AC tickling field) to detect magnetic response of a magnetic tags as taught by Dames to the method of Coehoorn to detect predetermined region of a magnetic marker or particles in assay". (Office Action mailed July 20, 2009 at page 6)

Applicants respectfully disagree and submit that in considering the references cited by the Examiner, one of ordinary skill in the art absent the teaching of the present specification, would **have no objective reason to combine** the cited references in the manner claimed in the subject application.

As discussed above, Applicants submit that one of ordinary skill in the art would not look to Dames for guidance because in contrast to the claimed invention, Dames teaches "using a DC current and AC current" for interrogating **macroscale** magnetic "tags", **not** magnetic nanoparticles as claimed. Indeed, in describing the dimensions of magnetic "tags", Dames discloses that "the minimum length of individual elements which can be used is probably on the order of a few millimeters" and that "the magnetic material is preferably in the form of a long thin strip". (see Dames at col. 3, lines 55-57 and col. 8, lines 22-27). As noted above, it is well established that magnetic nanoparticles possess unique magnetic properties which make them distinct from macroscale magnetic materials where the scientific literature is replete with examples demonstrating this distinction.

Furthermore, one of skill in the art would not look to Dames because the teachings of Dames preclude employing a magnetic nanoparticle as a "tag" and require that a "tag" be a macroscale magnetic material. Indeed, Dames teaches that a "tag" is "characterized by carrying a plurality of discrete magnetically active regions in a linear array" and is "formed from a continuous strip of high permeability material, discrete regions of which have their magnetic properties permanently or temporarily modified." (see Dames at col. 2,

line 66 – col. 3, line 1 and col. 3, lines 9-12). A magnetic nanoparticle, on the other hand, does not posses "a plurality of discrete magnetically active regions".

As such, Applicants submit that there would be no objective reason to combine the teachings of Dames, which employs **macroscale** magnetic materials to defeat the patentability of the instant claims which are specifically drawn to magnetic **nanoparticles**.

The Applicants further submit that Coehoorn as been improperly combined with Dames because Dames is not in the field of the Applicants' endeavor and is not reasonably pertinent to the particular problem that is the concern of the invention. The rejected claims are drawn to a high sensitivity method of detecting biological molecules bonded to magnetic nanoparticles. (see specification at page 2, [0003]-[0004]) On the other hand, Dames is drawn to interrogating macroscale magnetic "tags" for "inventory control, ticketing, automated shopping systems, monitoring work-in-progress, security tagging, access control, anti-counterfeiting". (see Dames at Column 1, lines 45-49) and as such is completely unrelated to the field of Applicants' endeavor.

Therefore, in making the rejection of the claims over Coehoorn in view of Dames, the Examiner has improperly combined the Dames reference, there being no motivation or suggestion to do so and the Dames reference being from an unrelated field. For this reason alone, the Examiner has failed to present a proper *prima facie* case of obviousness.

Furthermore, even if the references are combined in an attempt to read onto the rejected claims as suggested by the Examiner, Applicants submit that there is no objective reason to believe, absent the instant disclosure, that such a combination would be a predicted success.

Although the Examiner asserts that "it would have been obvious to one of ordinary skills in the art to apply the concept of using DC current and AC current (low frequency AC tickling field) to detect magnetic response of a magnetic tag as taught by Dames to the method of Coehoorn", none of the cited references teach or suggest that such a

modification would be a predicted success. To the contrary, Coehoorn is completely silent to applying a DC bias field and AC tickling field. As such, there is no evidence absent the instant specification, that applying a DC bias field and AC tickling field to the teachings of Coehoorn would result in a successful detection method. Likewise, one could not reasonably predict the effectiveness of applying a "DC current and AC current" as disclosed by Dames on a system employing magnetic nanoparticles since Dames specifically teaches macroscale magnetic materials and is completely silent to magnetic nanoparticles. There is no objective evidence absent the instant specification, to suggest that application of a "DC current and AC current" would be a predicted success when applied to magnetic nanoparticles since it is well established that magnetic nanoparticles possess unique magnetic properties which make them distinct from macroscale magnetic materials. Indeed, a magnetic nanoparticle would be unsuitable in the teachings of Dames since Dames discloses that "tags" are "characterized by carrying a plurality of discrete magnetically active regions in a linear array" and that the "minimum length of individual elements which can be used is probably on the order of a few millimeters".

Accordingly, in view of the arguments above, Applicants contend that the Examiner has not established that the claimed invention as a whole would have been obvious to a person of ordinary skill in the art at the time of the invention. As such, the Applicants submit that a *prima facie* case of obviousness has not been established, and thus respectfully request withdrawal of this rejection.

Claims 1, 2-8, 10, 11, 17 and 19 are rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Baselt et al (U.S. Patent No. 5,981,297 November 9, 1999) in view of Dames et al (United States Patent No. 6,323,770).

In making this rejection, the Examiner asserts that Baselt teaches a method for detecting target molecules such that "the method comprises providing a recognition molecules bound to a surface of a magnetic field sensor; adding target molecules bound to magnetic particles; exposing the magnetic particles bound target molecules to the surface

of the magnetic field sensor bound recognition molecules so that the molecules form a complex; detecting such complex'. The Examiner acknowledges that Baselt fails to teach the element of "applying a DC bias field and an AC tickling field". (Office Action mailed July 20, 2009 at pages 6) To remedy this deficiency, the Examiner cites Dames for its alleged teaching of "using a DC current and AC current to detect a magnetic tag" asserting that "it would have been obvious to one of ordinary skill in the art to apply the concept of using DC current and AC current (low frequency AC tickling field) to detect magnetic response of a magnetic tags as taught by Dames to the method of Baselt to detect predetermined region of a magnetic marker or particles in assay". (Office Action mailed July 20, 2009 at page 7)

Applicants respectfully disagree and submit that in considering the references cited by the Examiner, one of ordinary skill in the art absent the teaching of the present specification, would **have no objective reason to combine** the cited references in the manner claimed in the subject application.

As discussed above, Applicants submit that one of ordinary skill in the art would not look to Dames for guidance because in contrast to the claimed invention, Dames teaches "using a DC current and AC current" for interrogating **macroscale** magnetic "tags", **not** magnetic nanoparticles as claimed. Indeed, in describing the dimensions of magnetic "tags", Dames discloses that "the minimum length of individual elements which can be used is probably on the order of a few millimeters" and that "the magnetic material is preferably in the form of a long thin strip". (see Dames at col. 3, lines 55-57 and col. 8, lines 22-27). As noted above, it is well established that magnetic nanoparticles possess unique magnetic properties which make them distinct from macroscale magnetic materials where the scientific literature is replete with examples demonstrating this distinction.

Furthermore, one of skill in the art would not look to Dames because the teachings of Dames preclude employing a magnetic nanoparticle as a "tag" and require that a "tag" be a macroscale magnetic material. Indeed, Dames teaches that a "tag" is "characterized by carrying a plurality of discrete magnetically active regions in a linear array" and is "formed from a continuous strip of high permeability material, discrete regions of which

have their magnetic properties permanently or temporarily modified." (see Dames at col. 2, line 66 – col. 3, line 1 and col. 3, lines 9-12). A magnetic nanoparticle, on the other hand, does not posses "a plurality of discrete magnetically active regions".

As such, Applicants submit that there would be no objective reason to combine the teachings of Dames, which employs **macroscale** magnetic materials to defeat the patentability of the instant claims which are specifically drawn to magnetic **nanoparticles**.

The Applicants further submit that Baselt as been improperly combined with Dames because Dames is not in the field of the Applicants' endeavor and is not reasonably pertinent to the particular problem that is the concern of the invention. The rejected claims are drawn to a high sensitivity method of detecting biological molecules bonded to magnetic nanoparticles. (see specification at page 2, [0003]-[0004]) On the other hand, Dames is drawn to interrogating macroscale magnetic "tags" for "inventory control, ticketing, automated shopping systems, monitoring work-in-progress, security tagging, access control, anti-counterfeiting". (see Dames at Column 1, lines 45-49) and as such is completely unrelated to the field of Applicants' endeavor.

Therefore, in making the rejection of the claims over Baselt in view of Dames, the Examiner has improperly combined the Dames reference, there being no motivation or suggestion to do so and the Dames reference being from an unrelated field. For this reason alone, the Examiner has failed to present a proper *prima facie* case of obviousness.

Furthermore, even if the references are combined in an attempt to read onto the rejected claims as suggested by the Examiner, Applicants submit that there is no objective reason to believe, absent the instant disclosure, that such a combination would be a predicted success.

Although the Examiner asserts that "it would have been obvious to one of ordinary skills in the art to apply the concept of using DC current and AC current (low frequency AC tickling field) to detect magnetic response of a magnetic tag as taught by Dames to the

method of Baselt", none of the cited references teach or suggest that such a modification would be a predicted success. To the contrary, Baselt is completely silent to applying a DC bias field and AC tickling field. As such, there is no evidence absent the instant specification that applying a DC bias field and AC tickling field to the teachings of Baselt would result in a successful detection method. Likewise, one could not reasonably predict the effectiveness of applying a "DC current and AC current" as disclosed by Dames on a system employing magnetic nanoparticles since Dames specifically teaches macroscale magnetic materials and is completely silent to magnetic nanoparticles. There is no objective evidence absent the instant specification, to suggest that application of a "DC current and AC current" would be a predicted success when applied to magnetic nanoparticles since it is well established that magnetic nanoparticles possess unique magnetic properties which make them distinct from macroscale magnetic materials. Indeed, a magnetic nanoparticle would be unsuitable in the teachings of Dames since Dames discloses that "tags" are "characterized by carrying a plurality of discrete magnetically active regions in a linear array" and that the "minimum length of individual elements which can be used is probably on the order of a few millimeters".

Accordingly, in view of the arguments above, Applicants contend that the Examiner has not established that the claimed invention as a whole would have been obvious to a person of ordinary skill in the art at the time of the invention. As such, the Applicants submit that a *prima facie* case of obviousness has not been established, and thus respectfully request withdrawal of this rejection.

Claims 1-8, 10, 11, 14 and 15 are rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Terstappen et al (U.S. Patent No. 6,623,983 September 23, 2003) in view of Dames et al (United States Patent No. 6,323,770).

In making this rejection, the Examiner asserts that Terstappen teaches a method which "comprises providing one member of a specific binding pair bound to the collection surface and the other member bound to magnetic nanoparticles; exposing the magnetic

nanoparticles bound binding member to the collection surface to form a complex between the binding members; detecting said complex". The Examiner acknowledges that Terstappen fails to teach the element of "applying a DC bias field and an AC tickling field". (Office Action mailed July 20, 2009 at pages 8) To remedy this deficiency, the Examiner cites Dames for its alleged teaching of "using a DC current and AC current to detect a magnetic tag" asserting that "it would have been obvious to one of ordinary skill in the art to apply the concept of using DC current and AC current (low frequency AC tickling field) to detect magnetic response of a magnetic tags as taught by Dames to the method of Terstappen to detect predetermined region of a magnetic marker or particles in assay". (Office Action mailed July 20, 2009 at page 8)

Applicants respectfully disagree and submit that in considering the references cited by the Examiner, one of ordinary skill in the art absent the teaching of the present specification, would **have no objective reason to combine** the cited references in the manner claimed in the subject application.

As discussed above, Applicants submit that one of ordinary skill in the art would not look to Dames for guidance because in contrast to the claimed invention, Dames teaches "using a DC current and AC current" for interrogating **macroscale** magnetic "tags", **not** magnetic nanoparticles as claimed. Indeed, in describing the dimensions of magnetic "tags", Dames discloses that "the minimum length of individual elements which can be used is probably on the order of a few millimeters" and that "the magnetic material is preferably in the form of a long thin strip". (see Dames at col. 3, lines 55-57 and col. 8, lines 22-27). As noted above, it is well established that magnetic nanoparticles possess unique magnetic properties which make them distinct from macroscale magnetic materials where the scientific literature is replete with examples demonstrating this distinction.

Furthermore, one of skill in the art would not look to Dames because the teachings of Dames preclude employing a magnetic nanoparticle as a "tag" and require that a "tag" be a macroscale magnetic material. Indeed, Dames teaches that a "tag" is "characterized by carrying a plurality of discrete magnetically active regions in a linear array" and is

"formed from a continuous strip of high permeability material, discrete regions of which have their magnetic properties permanently or temporarily modified." (see Dames at col. 2, line 66 – col. 3, line 1 and col. 3, lines 9-12). A magnetic nanoparticle, on the other hand, does not posses "a plurality of discrete magnetically active regions".

As such, Applicants submit that there would be no objective reason to combine the teachings of Dames, which employs **macroscale** magnetic materials to defeat the patentability of the instant claims which are specifically drawn to magnetic **nanoparticles**.

The Applicants further submit that Terstappen as been improperly combined with Dames because Dames is not in the field of the Applicants' endeavor and is not reasonably pertinent to the particular problem that is the concern of the invention. The rejected claims are drawn to a high sensitivity method of detecting biological molecules bonded to magnetic nanoparticles. (see specification at page 2, [0003]-[0004]) On the other hand, Dames is drawn to interrogating macroscale magnetic "tags" for "inventory control, ticketing, automated shopping systems, monitoring work-in-progress, security tagging, access control, anti-counterfeiting". (see Dames at Column 1, lines 45-49) and as such is completely unrelated to the field of Applicants' endeavor.

Therefore, in making the rejection of the claims over Terstappen in view of Dames, the Examiner has improperly combined the Dames reference, there being no motivation or suggestion to do so and the Dames reference being from an unrelated field. For this reason alone, the Examiner has failed to present a proper *prima facie* case of obviousness.

Furthermore, even if the references are combined in an attempt to read onto the rejected claims as suggested by the Examiner, Applicants submit that there is no objective reason to believe, absent the instant disclosure, that such a combination would be a predicted success.

Although the Examiner asserts that "it would have been obvious to one of ordinary skills in the art to apply the concept of using DC current and AC current (low frequency AC

tickling field) to detect magnetic response of a magnetic tag as taught by Dames to the method of Terstappen", none of the cited references teach or suggest that such a modification would be a predicted success. To the contrary, Terstappen is completely silent to applying a DC bias field and AC tickling field. As such, there is no evidence absent the instant specification that applying a DC bias field and AC tickling field to the teachings of Terstappen would result in a successful detection method. Likewise, one could not reasonably predict the effectiveness of applying a "DC current and AC current" as disclosed by Dames on a system employing magnetic nanoparticles since Dames specifically teaches macroscale magnetic materials and is completely silent to magnetic nanoparticles. There is no objective evidence absent the instant specification, to suggest that application of a "DC current and AC current" would be a predicted success when applied to magnetic nanoparticles since it is well established that magnetic nanoparticles possess unique magnetic properties which make them distinct from macroscale magnetic materials. Indeed, a magnetic nanoparticle would be unsuitable in the teachings of Dames since Dames discloses that "tags" are "characterized by carrying a plurality of discrete magnetically active regions in a linear array" and that the "minimum length of individual elements which can be used is probably on the order of a few millimeters".

Accordingly, in view of the arguments above, Applicants contend that the Examiner has not established that the claimed invention as a whole would have been obvious to a person of ordinary skill in the art at the time of the invention. As such, the Applicants submit that a *prima facie* case of obviousness has not been established, and thus respectfully request withdrawal of this rejection.

Claims 9, 12, and 13 are rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Fox, or Baselt or Coehoorn in view of Dames as applied to claim 1, and further in view of Berning (United States No. 2005/0025969).

Claims 9, 12 and 13 depend from Claim 1. As discussed above, Fox, or Baselt or Coehoorn in view of Dames fails to render the instantly claimed invention obvious because

there is no apparent reason that would have prompted a person of ordinary skill in the relevant field to combine the references in the manner suggested by the Examiner, nor was there an objective reason to believe, absent the instant disclosure, that such a combination would be a predicted success.

Since Berning was merely cited only for its alleged teaching of "nanoparticles coated with a layer of gold including a magnetic nanoparticle central core and a coating of gold completely encapsulating the magnetic nanoparticle central core", Berning fails to make up for these deficiencies in Fox, Baselt or Coehoorn and Dames.

Accordingly, the Applicants respectfully request withdrawal of this rejection.

Claim 16 is rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Fox, or Baselt in view of Ferreira, et al. (*Journal of Applied Physics* Vol. 93, No. 10, 15 May 2003, pp. 7281-7286 submitted by Applicants).

In order to meet its burden in establishing a rejection under 35 U.S.C. §103, the Office must first demonstrate that a prior art reference, or references when combined, teach or suggest all claim elements. *See, e.g., In re Royka*, 490 F.2d 981, 985 (CCPA 1974); *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1740 (2007); *Pharmastem Therapeutics v. Viacell*, 491 F.3d 1342, 1360 (Fed. Cir. 2007); MPEP § 2143(A)(1). Moreover, "[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art." *See In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

In making this rejection, the Examiner asserts that Fox or Baselt teach all the elements of the claimed invention apart from "the substrate comprises a high sensitivity spin valve or a magnetic tunnel junction detector array". (Office action mailed July 20, 2009 at page 10). To remedy this deficiency, the Examiner cites Ferreira for its alleged teaching of "using arrays spin valve sensors to detect magnetically labeled biomolecules".

Applicants note that Claim 16 depends from Claim 1 and thus includes the element of "wherein said detecting comprises applying a DC bias field and an AC tickling field". Applicants submit that neither Fox nor Baselt teach or suggest this element as claimed. Indeed, both Fox and Baselt are completely silent as to applying a DC bias field an AC tickling field.

As Ferreira is merely cited for its asserted teaching of "using arrays spin valve sensors to detect magnetically labeled biomolecules", this reference fails to remedy the deficiencies in the teachings of Fox or Baselt.

As such, Claim 16 is not obvious under 35 U.S.C. §103(a) over Fox or Baselt in view of Ferreira. Applicants thus respectfully request withdrawal of this rejection.

Applicants submit that new Claim 48 is patentable for at least the reasons above.

## CONCLUSION

Applicants submit that all of the claims are now in condition for allowance, which action is requested. If the Examiner finds that a Telephone Conference would expedite the prosecution of this application, he is invited to telephone the undersigned at the number provided.

The Commissioner is hereby authorized to charge any other fees under 37 C.F.R. §§ 1.16 and 1.17 which may be required by this paper, or to credit any overpayment, to Deposit Account No. 50-0815, order number STAN-571.

Respectfully submitted,
BOZICEVIC, FIELD & FRANCIS LLP

Date: October 5, 2009 By: /Bret E. Field, Reg. No. 37,620/
Bret E. Field
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encs:

- Exhibit 1 - Lu, et al. *Angew. Chem. Int. Ed.* 2007; 46: 1222-1244
- Exhibit 2 - Lin, et al. *J. Magnet. Magnet. Mat.* 2006; 305: 100-109

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